TRAVAUX DU MUSÉUM NATIONAL D'HISTOIRE NATURELLE «GRIGORE ANTIPA»

THE JOURNAL OF "GRIGORE ANTIPA" NATIONAL MUSEUM OF NATURAL HISTORY

Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 65 (2): 81–86 (2022)
doi: 10.3897/travaux.65.e98562

RESEARCH ARTICLE

Preliminary investigations of the main *Flavescence dorée* vector *Scaphoideus titanus* and its first record in Kosovo

Gazmend Gjinovci[1, 3], Bekri Xhemali[1, 4], Betim Bresilla[1, 5], Shpend Shahini[3], Nesim Morina[2], Tasim Bajrami[2]

1 *Laboratory of Plant Protection, Kosovo Institute of Agriculture, Pejë, Kosovo*
2 *Department of Vineyards and Wine, Ministry of Agriculture, Rahovec, Kosovo*
3 *Department of Plant Protection, Agricultural University of Tirana, Albania*
4 *Department of Life Science, University of Modena and Reggio Emilia, Italy*
5 *Department of Soil Science, Hungarian University of Agriculture and Life Sciences, Hungary*

Corresponding author: *Bekri Xhemali* (xhemalibekri@gmail.com)

Received 7 December 2022 | Accepted 19 December 2022 | Published 31 December 2022

Citation: Gjinovci G, Xhemali B, Bresilla B, Shahini S, Morina N, Bajrami T (2022) Preliminary investigations of the main *Flavescence dorée* vector *Scaphoideus titanus* and its first record in Kosovo. Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 65(2): 81–86. https://doi.org/10.3897/travaux.63.e98562

Abstract

Scaphoideus titanus Ball is a major pest of grapevine in Europe, being the main vector of *Flavescence dorée* phytoplasma (FDp). The North American grapevine leafhopper was identified in neighboring countries, however, the FDp vector was not recorded and there is no available data on its presence in Kosovo. In 2021, initial investigations were conducted and field surveys were carried out in the region of Rahovec in order to evaluate the presence of *S. titanus* in Kosovarian vineyards. The survey was established in seventeen vineyards in different locations and grapevine varieties. In the middle of June, in each vineyard chosen for investigation were settled yellow sticky traps for surveying and sampling of leafhoppers. All plantations were subjected to fungicide treatment and no insecticide treatment was applied for *S. titanus.* The captures on the yellow sticky traps indicated that the North American grapevine leafhopper was present in Kosovo. Its population was different in investigated vineyards. Of the seventeen vineyards monitored, in twelve of them was captured the FDp vector, two sticky traps were damaged, and in three vineyards was not captured any specimen of *Scaphoideus titanus.* An average, of two up to forty-nine specimens of *S. titanus* per trap were collected over the surveyed period from the beginning of June until the end of September 2021. These results show only the distribution of *S. titanus* in the surveyed area. Furthermore, the presence of the North American grapevine leafhopper in Kosovo is an alert for urgent phytosanitary control of the quarantine phytoplasma *Flavescence dorée* (FD).

Copyright *Gjinovci, Xhemali, Bresilla, Shahini, Morina & Bajrami*. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

PENSOFT

Keywords
FDp vector, *Scaphoideus titanus* Ball, vineyards, Kosovo.

Introduction

The North American grapevine leafhopper (*Scaphoideus titanus* Ball 1932) originated from North America and was introduced in Europe in the 1920s. It was found for the first time in France in 1924 (Daire et al. 1997). The Nearctic leafhopper *Scaphoideus titanus* Ball is a grapevine disease transmitted vector of a phytoplasma-associated *Flavescence dorée* (FDp) (Schvester et al. 1963). The vector can cause severe damage to viticulture and it has reached 12 EU Member States (Austria, Bulgaria, Croatia, Czech Republic, France, Hungary, Italy, Portugal, Spain, Romania, Slovenia and Slovakia) and six more European countries (Bosnia Herzegovina, Moldova, Montenegro, Serbia, Switzerland and Ukraine), making its distribution wider than that of FDp (EFSA PLH Panel 2016). The North American grapevine leafhopper years earlier was identified in neighboring countries of Kosovo, in Serbia was first reported in 2004 (Magud and Toševski 2004) and in Montenegro was found in August 2008 (Radonjić et al. 2008). In addition, there are no possible data about its presence in two other neighboring countries, Albania and North Macedonia. However, the vector of FDp has not been previously reported in Kosovo and its presence has not been registered. In Europe, *Scaphoideus titanus* Ball feeds only on grapes, but in North America, it might be found also on *Rumex* and *Fraxinus* and other species (Mori et al. 2002). The leafhopper feeds on the lower surface of the leaves. However, the life cycle of the pest, the larvae of 4th and 5th instars, and imagoes can transmit disease (Caudwell et al. 1970). These insects keep their infection ability during their whole life (Lefol et al. 1993). The transmission of the phytoplasma can be started one month after the first individuals hatch from eggs. The main mechanisms of FDp transmission from one grapevine plant to another is mainly natural, through the saliva of phloem sap-sucking leafhoppers of the species *Scaphoideus titanus*. The leafhopper acquires FDp while feeding on the leaves of infected plants at all its growth stages (from the first nymph to imago) and becomes infectious after a latent period of 4–5 weeks (Chuche and Thiéry 2014).

Material and Methods

The survey was conducted from the beginning of June until the end of September 2021. The initial investigations were carried out in the region of Rahovec, the main grapevine area of Kosovo (Fig. 1). Seventeen vineyards were chosen for setting the experiment among the city of Rahovec and its villages, Drenoc, Rezina, and Deshkidovë. Meanwhile, main grapevine varieties were chosen for the survey, such as: Victoria, Chardonnay, Riesling, Cabernet Franc, Red Burgundy, Rayners Riesling,

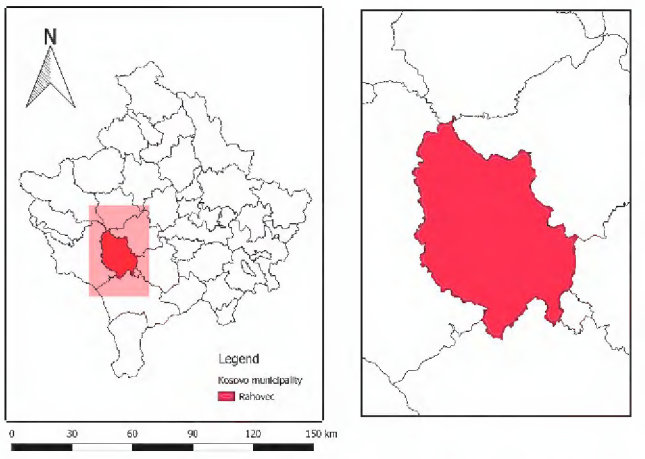

Figure 1. Main region of grapevine production.

and Vranç (Table 1). All plantations were subjected to fungicide treatment and no insecticide treatment was applied for *S. titanus*. On June 26, 2021, each selected vineyard had settled yellow sticky traps (Insect trap Aria® 10×25 cm). They were fixed in the foliage of the plants at 1–1.5 meters in height. A monitoring plan was established, while the field inspections were carried out along these dates: 02.07., 16.07., 30.07., 13.08., 27.08., 10.09. and 24.09. Although the FDp vector was not reported in the past, the first capture of the North American grapevine leafhopper in Kosovo was recorded on 16.07.2021 (Fig. 2). In order to identify captured leafhoppers, identification keys by Giustina (1989) were used. The determination of all specimens was confirmed by the identification key.

Results and Discussions

The North American grapevine leafhopper which is known to be the main vector of FDp (Mori et al. 2002; Galetto et al. 2016) was recorded in twelve of the monitored vineyards, two sticky traps were damaged and in three of monitored vineyards was not captured any specimens of *Scaphoideus titanus* Ball. Therefore, the captures on the yellow sticky traps indicated that the North American grapevine leafhopper was present in Kosovo. Its population was different among the whole investigated vineyard. However, as is presented in Table 1, the population differs from surveyed plantations. The lowest population was indicated in Drenoc to the variety Chardonnay and in Rezina to the Red Burgundy variety. Whereas, the highest population was recorded in Rahovec to the Victoria variety. Moreover, in three yellow sticky traps was not recorded any specimens of *S. titanus*. Two other traps were damaged due to weather conditions or possibly from animals that passed across the placed sticky traps.

The main vector of *Flavescence dorée* phytoplasma (FDp) was identified in neighboring countries of Kosovo (Magud and Toševski 2004; Radonjić et al. 2008), however, its presence have not been reported in our country. Therefore this study recorded for the first time the presence of *Scaphoideus titanus* Ball in the territory of Kosovo.

Table 1. The surveyed locations and the main grapevine varieties of our study.

No. of sticky trap	No. of specimens for each trap	Place of the vineyards	Variety
1	49	Rahovec	Victoria
2	3	Drenoc	Chardonnay
3	0	Drenoc	Unknown
4	15	Drenoc	Chardonnay
5	11	Rahovec	Victoria
6	2	Rezina	Riesling
7	9	Rezina	Cabernet Franc
8	2	Rezina	Red Burgundy
9	0	Rahovec	Rayners Riesling
10	0	Rahovec	Riesling
11	2	Drenoc	Chardonnay
12	Damaged	Deshkidovë	Vranç
13	8	Deshkidovë	Chardonnay
14	15	Deshkidovë	Vranç
15	7	Deshkidovë	Vranç
16	12	Deshkidovë	Red Burgundy
17	Damaged	Deshkidovë	Vranç

Figure 2. First capture of *S. titanus* Ball in Kosovo.

Conclusions

Scaphoideus titanus Ball is a major pest of grapevine in Europe, being the main vector of *Flavescence dorée* phytoplasma (FDp). The monitoring results showed that the North American grapevine leafhopper was present in Kosovo. Although its population was different among the whole investigated vineyards, however, its presence could encourage farmers to monitor their fields in order to evaluate the accurate time of spraying and further control measurements. These results show only the distribution of *S. titanus* in the surveyed area. The presence of the Nearctic leafhopper is an alert for urgent phytosanitary control of the quarantine phytoplasma *Flavescence dorée* (FD).

Acknowledgments

The authors are grateful to the farmers of the investigated area who were gently helping with proper information in our multiple questions during the surveyed period.

References

Caudwell A, Kuszala C, Bachelier J, C. Larrue J (1970) Transmission de la *Flavescence dorée* de la vigne aux herbacées par l'allongement du temps d'utilisation de la cicadelle *Scaphoideus littoralis* Ball et l'étude de sa survie sur un grand nombre d'espèces végétales. Annales de Phytopathologie 2: 415–428. [in French]

Chuche J, Thiéry D (2014) Biology and ecology of the *Flavescence dorée* vector *Scaphoideus titanus*: a review. Agronomy for Sustainable Development 34(2): 381–403.

Daire X, Clair D, Larrue J, Boudon-Paideu E (1997) Survey for grapevine yellows in diverse European countries and Israel. Vitis 36: 53–54.

EFSA Panel on Plant Health (PLH), Jeger M, Bragard C, Caffier D, Candresse T, Chatzivassiliou E, Dehnen-Schmutz K, Gilioli G, Jaques Miret JA, MacLeod A, Navajas Navarro M, Niere B, Parnell S, Potting R, Rafoss T, Urek G, Rossi V, Van Bruggen A, Van Der Werf W, West J, Winter S, Bosco D, Foissac X, Strauss G, Hollo G, Mosbach-Schulz O, Grégoire J-C (2016) Scientific opinion on the risk to plant health of *Flavescence dorée* for the EU territory. EFSA Journal 14(12): 4603, 83 pp. doi:10.2903/j.efsa.2016.4603

Galetto L, Miliordos DE, Pegoraro M, Sacco D, Veratti F, Marzachi C, Bosco D (2016) Acquisition of *Flavescence dorée* phytoplasma by *Scaphoideus titanus* Ball from different grapevine varieties. International Journal of Molecular Sciences 17(9): 1563 pp.

della Giustina W (1989) Homoptères Cicadellidae 3. Compléments aux ouvrages d'Henri Ribaut. Faune de France 73, FFSSN et INRA, Paris, 350 pp. [in French]

Lefol C, Lherminier J, Boudon-Padieu E, Larrue J, Louis C, Caudwell A (1994) Propagation of the *Flavescence dorée* Mycoplasm organism in the leafhopper vector *Euscelidius variegatus* Kbm. Journal of Invertebrate Pathology 63: 285–293.

Mori N, Bressan A, Martini M, Guadagnini M, Girolami V, Bertaccini A (2002) Experimental transmission by *Scaphoideus titanus* ball of two *Flavescence dorée*-type phytoplasmas. Vitis 41: 99–102.

Magud B, Toševski I (2004): *Scaphoideus titanus* Ball. (Homoptera, Cicadellidae) nova štetočina u Srbiji. Biljni lekar, Novi Sad 32(5): 348–352 [in Serbian]

Mori N, Bressan A, Martini M, Guadagnini M, Girolami V, Bertaccini A (2002) Experimental transmission by *Scaphoideus titanus* Ball of two *Flavescence dorée*-type phytoplasmas. Vitis-Geilweilerhof 41(2): 99–102.

Radonjić S, Hrnčić S, Krstić O, Toševski I, Jović J (2012) Presence and distribution of *Scaphoideus titanus* Ball (Hemiptera: Cicadellidae) in the vineyards of Montenegro. In: Proceedings of the International Symposium on Current Trends in Plant Protection, Institute for Plant Protection and Environment, Belgrade, Serbia, 25–28th September 2012, pp. 506–510.

Schvester D, Carle P, Montous G (1963) Transmission de la *Flavescence dorée* de la vigne par *S. littoralis* Ball. Annales des Epiphyties 14: 175–198. [in French]